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FLETCHER LAKE, INDIANA, AND ITS FLORA AND  
FAUNA.\*

BY BARTON W. EVERMANN AND H. WALTON CLARK.

U. S. Bureau of Fisheries.

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Fletcher Lake is situated in the southwest corner of Fulton County, Indiana, about 12 miles nearly due north from Logansport, and only a few rods north of the Cass County line. It is about 3 miles northeast of Lucerne on the Terre Haute and Logansport Railway. Its position is about  $40^{\circ} 55' 30''$  north latitude and  $86^{\circ} 18' 16''$  west longitude. It is among the southernmost glacial lakes of Indiana.

The writers visited Fletcher Lake, October 6, 1900, in the interest of the U. S. Bureau of Fisheries, for the purpose of making a physical and biological survey of it. Many soundings were taken and the depths of the lake in many places accurately determined. Many temperature observations were made and recorded, the character of the bottom and shores studied, and collections made of the animal and plant life of the lake. In these investigations valuable assistance was rendered by Messrs. John J. Hildebrandt and A. P. Jenks of Logansport.

Fletcher Lake is an elongate body of water with parallel sides and no bays, capes or marked irregularities of shore line. Its length is about  $\frac{2}{3}$  of a mile and its width  $\frac{1}{2}$ , the area being about 30 acres. It appears to occupy a sort of closed-up, narrow valley. The long axis lies nearly due east and west. The abruptness of the descent all around the lake is worthy of note, as in this respect it differs markedly from Lake Maxinkuckee, and closely resembles such lakes as Holem, Cook and Meyers † of the Twin Lakes group in Marshall County, Indiana.

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† On recent maps called Southwest Lake, Northwest Lake and East Lake.

The water near shore and usually out for a distance of 50 feet or less is shallow. At the edge of this narrow shelf the depth suddenly increases to 15 to 25 feet. The soil about the lake appears in general to contain considerably more clay than that about Lake Maxinkuckee. The shores are nearly everywhere high and dry. The south shore is high for its entire length, and a few yards back is the terrace of a former shore-line. A similar but less distinct terrace is seen on the north side. On the north shore is some little marsh ground, and the ground at both ends of the lake is rather mucky and quaky. The lake is said to have once reached a considerably greater distance toward the enclosing hills, but was artificially drained to a lower level. It has, however, little or none of the lake-plain aspect characteristic of lowered lakes such as Eagle Lake, which is a good type of lowered lakes, or the marshes about the inlet and outlet of Lake Maxinkuckee.

The catchment basin of the lake is quite small. At its head is a little draw or ravine which, in wet weather, brings down water about 2 miles. There are a few ditches also running into the lake. The outlet is periodic, dry at the time the lake was visited, but during wet weather connecting with a small creek at its west end. The outlet is called Bluegrass Creek. This flows into Indian Creek which takes a course nearly due west to the Tippecanoe, of which it is a tributary.

Although, as has been said, Fletcher Lake quite closely resembles some of the Twin Lakes in general outline, it differs from them, Holem Lake in particular, in having firm shores. There is no fine sand beach such as is characteristic of Lake Maxinkuckee.

Just as the soil and shore differ somewhat from Lake Maxinkuckee, so does the land vegetation. No collections were made in the short time spent there, but the following notes were taken:

Among the sedges, the low sedge (*Cyperus diandrus*) and the straw-colored sedge (*C. strigosus*), common beach plants at Lake Maxinkuckee, are here present also, as is also the little composite, *Eclipta alba*. The cocklebur and barnyard grass, both of which form a pretty continuous fringe about Lake Maxinkuckee, are here uncommon or wanting; but, as lake shore vegetation varies considerably from year to year this is not necessarily a constant difference. The rough sedge (*Cyperus*

*inflexus*), which is very rare at Lake Maxinkuckee, and not very near the lake, was rather common on the shore at Fletcher Lake, and *Hemicarpha micrantha*, a delicate little bulrush-like sedge, which was not found at Lake Maxinkuckee, was found to be rather common. The naturalized bittersweet nightshade, *Solanum dulcamara*, which is not present near Lake Maxinkuckee, but which grows in abundance in a tamarack swamp several miles west of that lake, was common near the shore of Fletcher Lake and conspicuous by reason of its scarlet berries. The leafy bulrush, *Scirpus polyphyllus*, a plant of rather erratic distribution, not found at all at Eagle Lake or Lake Maxinkuckee, but seen in scattered clumps at others, was found here. The soapwort gentian (*Gentiana saponaria*) grows in considerable abundance near the lake. Other plants which enter into a general picture of the region, are the clumps of low willows, tangles of drop-seed grass (*Muhlenberghia*), and arrow-leaved tear thumb (*Polygonum sagittatum*), Carolina rose (*Rosa carolina*), tall blue verbena (*Verbena hastata*), patches of peppermint (*Mentha piperita*), stretches of sticktight (*Bidens connata*) now brown and bristling, clumps of Cornus (*Cornus sericea*), bunches of iron weed (*Vernonia fasciculata*) and fragrant goldenrod (*Euthamia graminifolia*). Along the marshy portions and at places near shore were blue flags and *Eleocharis*, and tangles of swamp loosestrife (*Decodon verticellata*) and patches of cattails (*Typha latifolia*).

The aquatics with emersed leaves, the spatterdock or yellow pond lily (*Nymphaea advena*), the grass-leaved arrowhead (*Sagittaria graminea*) most of the leaves of which were submersed, the creeping spike-rush (*Eleocharis palustris*), the shining pondweed (*Potamogeton lucens*), the white water lily (*Castalia odorata*), the bulrushes (*Scirpus lacustris* and *S. americanus*) and the pickerel-weed (*Pontederia cordata*) are confined to a narrow belt on account of the set-off in the bottom near shore. The aquatics with submerged leaves, among which were the whorled-leaved milfoil (*Myriophyllum verticillatum*), hornwort (*Ceratophyllum demersum*), the ditch moss (*Philotria canadensis*), Naius, water marigold (*Bidens beckii*), fennel-leaved pondweed (*Potamogeton pectinatus*) and the eel-grass pondweed (*Potamogeton zosterifolius*), were exceedingly abundant; so much so that masses of them, especially *Philotria*, collected in great rolls

before the net and interfered seriously with seining operations. Various algae, among which were *Chara*, *Spirogyra* and *Mesocarpus*, were quite abundant; on the *Chara* grew considerable attached *Rivularia*.

The water of Fletcher Lake was at the time of our visit a clear lively green like that of Lake Maxinkuckee, and without the yellowish cast characteristic of Eagle Lake. No plankton was collected.

A number of soundings and bottom temperatures were recorded. The only vessels of any kind on the lake were about a dozen flat-bottomed boats, excellent for cruising about near shore, but very difficult to row straight and hard to keep in place, especially during a wind, such as prevailed at the time. However, it is believed that the soundings taken are sufficient to determine the maximum depth and general topography of the lake bottom.

Several lines of soundings were run and temperatures taken as follows:

1. A line on the long axis and in the center of the lake from east to west. Depths in feet—22.5, 35, 31.5, 33.5, 34, 16.5. Bottom temperatures in fahrenheit degrees: 51°, 47.1°, 47.9°, 48.5°, 47°, 64.4°. Temperature of air, 77°.
2. A line on the long axis, from east to west, taking a sounding at every 10 oar-strokes. Each stroke carried the boat about 5 feet, thus putting the soundings at intervals of about 50 feet. Depths in feet—5, 22, 34, 34, 34, 32, 32, 34, 32, 32, 34, 40, 41, 40, 33, 28, 28, 30, 28, 26, 32, 38, 40, 40, 37, 30, 28, 15, 5.
3. A line from south to north about 200 feet east of the west end. Depths in feet—15, 19, 24, 34, 38, 38, 33, 30, 21, 16, 6.
4. A line from north to south beginning about 200 feet east of north end of line 3, and ending about 300 feet east of south end of line 3. Depths—5, 14, 19, 24, 28, 28, 28, 28, 29, 29, 28, 30, 31, 35, 34, 31, 21, 14.
5. A line from the camp site on south shore to a point on shore 400 feet east of the brick house. Depths—8, 19, 21, 27, 30, 32, 30, 26, 20, 20, 17, 12, 2.

6. A line from north to south parallel to line 5, but about 300 feet east of it. Depths—8, 17, 19, 22, 26, 28, 28, 29, 28, 28, 25, 20, 16, 6.
7. A line north from the boat-landing near Hall's house. Depths—2, 12, 18, 24, 36, 40+, 40+, 34, 32, 12, 3.
8. A line from the ice-house on north side near the church southwest to Hall's boat-landing. Depths—7, 16, 19, 20, 20, 22, 26, 26, 24, 24, 26, 28, 27, 30, 32, 38, 39, 41, 42, 41, 41, 40, 38.

The lake seems to occupy a long, narrow trough, with abrupt sides all around and with pretty uniform depth. There are 2 deep holes,—one just off Hall's landing and another about the same distance from the west end of the lake. The depth in each of these scarcely exceeds 40 feet,—the greatest found in the eastern being 42 feet, and 40 feet in the western.

The abruptness of the descent all around the lake is worthy of note, as this lake in this regard differs markedly from Lake Maxinkuckee.

The water of Fletcher Lake is unusually cold: The bottom temperature is about 2 degrees lower than that of Lake Maxinkuckee, although the depth is less than half as great. This greater coldness has its effect on the animal and plant life of the lake. The game and food-fishes are sufficiently numerous as to species and individuals to make it of considerable interest to local anglers. Of the 22 species of fishes known from it, at least 14 are food-fishes of some value and at least 8 possess some game qualities. The most important are the straw bass, calico bass and the yellow perch. Each of these is sufficiently abundant to attract many anglers to this beautiful little lake.

#### FAUNA OF FLETCHER LAKE.

Not much attention was paid to any of the animals of the lake except the fishes. A large number of dead shells of *Planorbis campanulata* were seen on shore, and mussels were said to be pretty abundant (*Anodonta grandis*), specimens of which were later sent us by Mr. Joseph Clark Taylor of Logansport. A number of whirligig beetles were noticed on the surface of the water, and several cricket frogs were caught.

The following is a list of the fishes known from this lake:

1. **Amia calva** Linnaeus.

DOGFISH.

Probably not rare.

2. **Ameiurus natalis** (Le Sueur).

YELLOW CAT.

Not uncommon.

3. **Ameiurus nebulosus** (Le Sueur).

COMMON BULLHEAD.

Common.

4. **Catostomus commersonii** (Lacépède).

COMMON SUCKER.

Not rare.

5. **Moxostoma aureolum** (Le Sueur).

COMMON REDHORSE.

Probably not common.

It is said that the suckers and redhorse run out to the prairie through the outlet during high water in the spring.

6. **Campostoma anomalum** (Rafinesque).

STONEROLLER.

Our collection contains one specimen, 3.5 inches long.

7. **Pimephales notatus** (Rafinesque).

BLUNT-NOSED MINNOW.

Common. We have in our collection 7 specimens ranging in length from 3 to 3.5 inches.

8. **Abramis crysoleucas** (Mitchill).

GOLDEN SHINER; ROACH.

Abundant. We have 21 specimens, from 3 to 4 inches long. The peritoneum is blackish. There are a few encysted trematodes in the skin (*Diplostomum*), 5 fishes being affected; 4 with 1 and 1 with 4 of these trematodes. The stomach of one specimen examined contained a considerable amount of *Spyrogyra* (well disintegrated), a species with short cells, and a few insect remains.

9. **Notropis whipplii** (Girard).

SILVERFIN.

There are 2 specimens in the collection, each about  $3\frac{1}{4}$  inches long.10. **Erycimba buccata** Cope.

CAVERN-JAWED MINNOW.

One specimen  $3\frac{1}{4}$  inches long was procured.11. **Lucius vermiculatus** (Le Sueur).

GRASS PIKE.

Rather common.

12. **Fundulus notatus** (Rafinesque).

TOP MINNOW.

Our collection contains 4 specimens from  $1\frac{1}{2}$  to 2 inches long. All are

immature, and have the rudimentary cross-bars still present making the lateral band very irregular in outline. The short bars are vertical on the anterior part of the fish but on the caudal peduncle they slant backward.

13. **Fundulus dispar** (Agassiz).

TOP MINNOW.

One specimen obtained.

14. **Pomoxis sparoides** Lacépède.

CALICO BASS.

There are two specimens in the collection 3 and  $3\frac{1}{2}$  inches long. These are rather slender and have the blotches on the sides arranged more or less regularly in bars or rings, in this respect quite closely resembling *P. annularis*. One, however, has 7 dorsal spines and the other 8. They are locally called crappie.

15. **Ambloplites rupestris** (Rafinesque).

ROCK BASS

Probably common.

16. **Chænobryttus gulosus** (Cuvier & Valenciennes).

WARMOUTH; MUD BASS.

One specimen  $4\frac{1}{2}$  inches long. It is probably common here.

17. **Lepomis pallidus** (Mitchill).

BLUEGILL.

Very common, but reaching a small size.

18. **Eupomotis heros** (Baird & Girard).

We have 4 specimens each about 5 inches long. It appears to be one of the most common fishes here. Mr. Hall called them "Goggle-eye."

19. **Micropterus salmoides** (Lacépède).

STRAW BASS.

Young examples 4 or 5 inches long were very common. Good-sized fishes of this species are often caught, though fishing is said to be poor this year. The small-mouth black bass does not occur in this lake.

20. **Perca flavescens** (Mitchill).

YELLOW PERCH.

Very abundant.

21. **Etheostoma hildebrandti** Evermann & Clark sp. nov.

Among the darters collected is one which was identified in the field as *Etheostoma iowa*, but which, on closer examination, proves to belong to an undescribed species.

It may be described as follows:

Head 3.78 in length; depth 6.52; eye 3.96 in head; snout 5.95 in head or 1.5 in eye; mandible 2.97; interorbital 5.97 or equal to snout; preorbital 7.93; D. VIII-9; A II, 7; scales 5-63-8, 26 developed tubes and about 15 more rather faint pores.

Body slender and elongate, somewhat compressed, the caudal peduncle long and slender; head rather long when considered in its entirety but

short and blunt anteriorly, the snout short and rounded; jaws about equal; mouth small, nearly horizontal, the tip of maxillary reaching about to anterior edge of pupil; eye large, placed high.

Scales small, the first row on the back above rather smaller and irregularly placed; cheeks, opercles, and breast well scaled; belly with ordinary scales.

Spinous dorsal rather high, highest anteriorly, the longest spine 2 in head, the spines slender, the edge of the membrane forming straight chords joining the spines near their tips; the base of the fin 1.20 in head and covering about 14 rows of scales; dorsals well separated, the space between them 4.25 in head and covering about 3 rows of scales; soft dorsal rather high and rounded, its longest ray equal to the longest spine, 2 in head, the base of the fin 1.32 in head and covering about 15 rows of scales; anal fin rather large, its first spine 2.97 in head, the second spine considerably shorter; the base of the fin 2.38 in head, covering 7 rows of scales; pectoral long, acutely rounded, reaching to tip of ventral or half-way to vent; ventrals rather short, acutish, their length 1.25 in head; caudal rather acute, its length 1.48 in head.

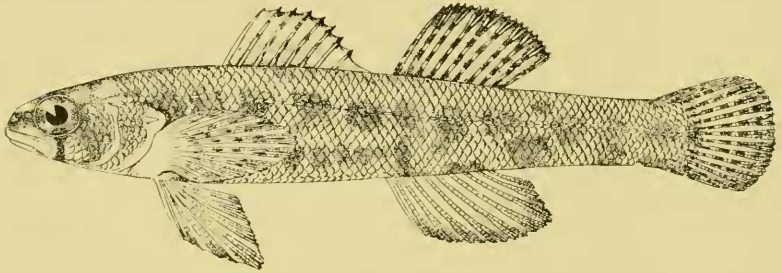


Fig. 1.

*Ethcostoma hildebrandti* Evermann & Clark. Type.

Ground color, straw-yellow; sides blotched all over with irregular brown blotches; a series of rather elongate blotches along middle of side; belly plain; dorsals, caudal and pectorals with blotches consisting of dots, lines and minute punctulations on the rays, these somewhat elongate on the caudal and roundish on the other fins; these dots arranged in rather zigzag bars; a dark streak downward from the eye.

This darter differs from *E. iowa*, to which it appears to be most closely related, in the well scaled breast and the more slender form.

The type (about  $2\frac{3}{8}$  inches long) is No. 64,616, U. S. National Museum.

We take pleasure in naming this new species for our friend, Mr. John J. Hildebrandt of Logansport, Indiana, an enthusiastic angler and a good naturalist.

## 22. *Microperca punctulata* Putnam.

LEAST DARTER.

We have in our collection 1 specimen of this species about  $1\frac{1}{2}$  inches long.